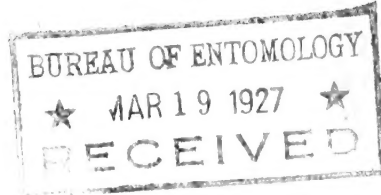


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UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology
Washington, D. C.



QUESTIONS & ANSWERS

ON THE

EUROPEAN CORN BORER



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Questions and Answers

1. How and when was the European corn borer brought into this country?

Ans. It came into this country about 17 years ago in shipments of broom-corn from southern Europe, Italy, and Hungary, some of which landed near Boston. That was before any law on the subject or any power to guard against such a pest had been provided. As a matter of fact, we knew little about the corn borer in Europe. It had been a minor pest there and little mention of it was found in European literature. It was not recognized or reported as one of the principal pests of Europe and we were not on guard against it. This period 1909-1910, when the broomcorn came over, was a period when we had a very short crop in this country, and there was an unusually large importation during that period, about 10,000 tons of broom-corn being brought in from abroad. The broomcorn was distributed at many different points, and a separate infestation also occurred in Ontario, Canada. The corn borers which are now causing the most serious trouble came across Lake Erie and Lake St. Clair from Canada and from various points of infestation in the United States.

2. On what plants does the corn borer live?

Ans. In Massachusetts the insect is now known to infest more than 200 different plants. In fact the borer may infest any kind of succulent plant or even plants that are ordinarily not considered succulent, such as the grapevine. It infests corn from the top clear to the ground, and occasionally goes into the ground 2 or 3 inches. Corn is the favorite host plant and in the lake region it is corn which is principally attacked, other plants having very little infestation. Around Boston, where corn is scarce, the borer feeds on a great diversity of crops and breeds in many sorts of wild plants and weeds.

3. What is the life history of the borer? What is meant by the single-generation form? Two-generation form?

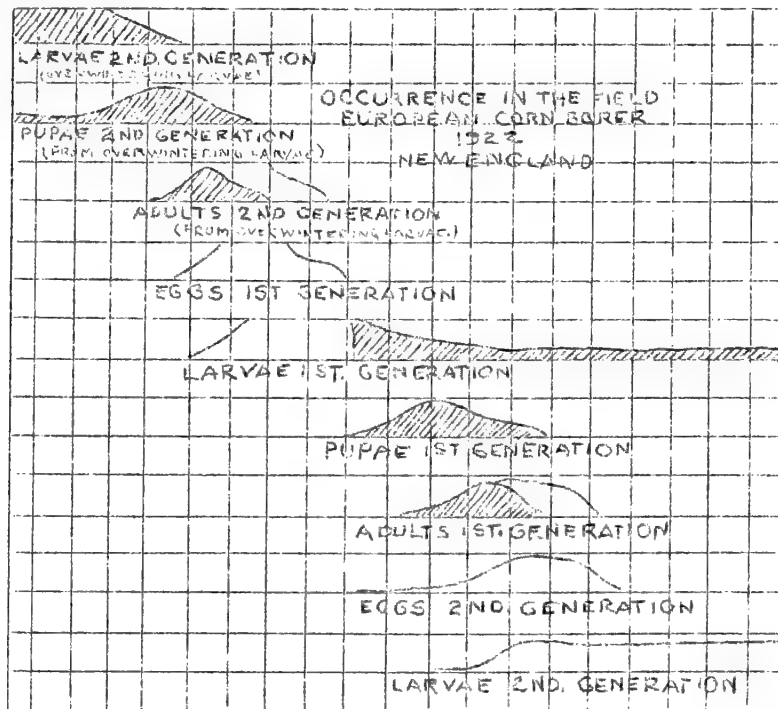
Ans. The corn borer has two distinct habits of reproduction in the United States. In the Great Lakes region it reproduces but once a year. This is known as the single-generation form. In New England it reproduces twice a year. This is known as the two-generation form.

In the case of the single-generation the moths that emerge in the spring lay their eggs, which produce one brood of larvae that do the damage. These larvae mature in the fall and hibernate during the winter. They emerge again as moths the next spring. The moth which lays the egg lives two or three weeks and can fly some distance. The egg stage exists for an average of ten days (5 to 12 days, depending on the temperature). In the lake region the eggs hatch in June or July and the borer becomes mature in September. It then goes through the winter and becomes a moth again in the following June. It hibernates in the borer stage for about seven months before it becomes a moth.

In the case of the two-generation form of the New England area the moths emerge in the spring and lay their eggs, from which a brood of larvae is produced. These larvae develop rapidly and moths emerge in June. The new moths then lay eggs producing a brood of larvae in July or August, which go into hibernation in the fall and emerge as moths the following spring. In the two-generation area the seasons have been dry and cooler than usual for the last few years, so that the second generation was weakened and a great many larvae died or failed to mature until the following spring.

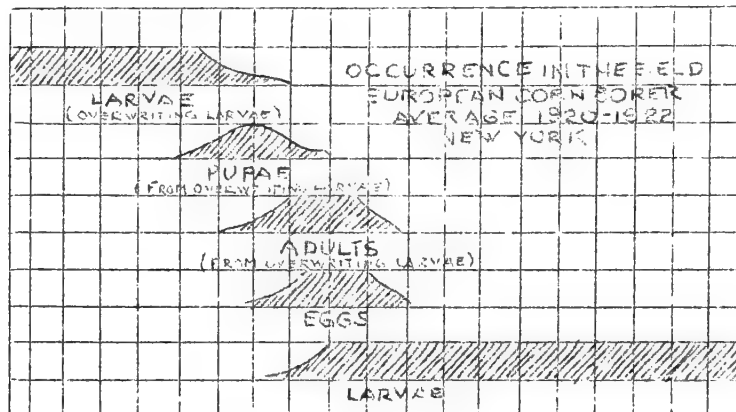
Seasonal Occurrence of the European Corn Borer

APRIL MAY JUNE JULY AUG. SEPT. OCT.



Seasonal history in New England during 1922. Shaded areas denote actual field counts. Areas inclosed by lines show the probable occurrence of eggs and immature larvae, and the length of life of adults, as determined by plotting rearing records and from field observations

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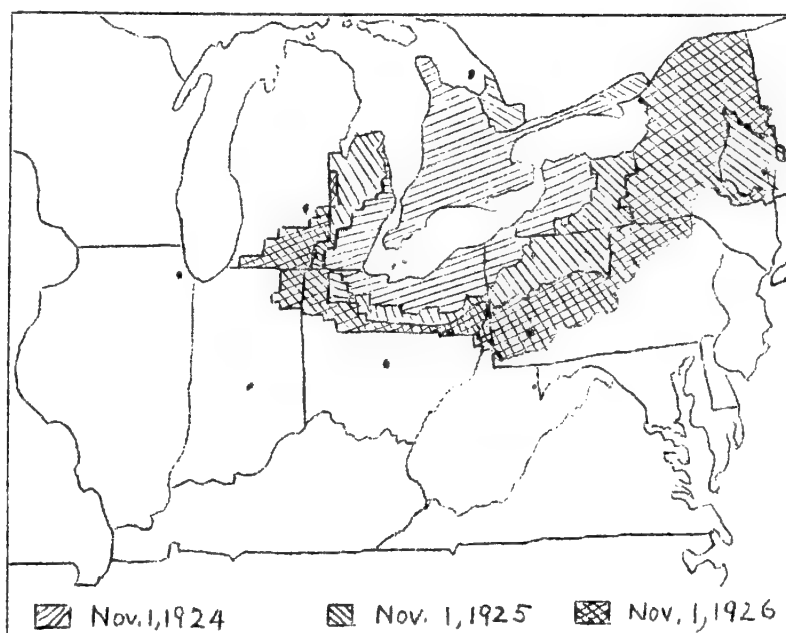


Seasonal occurrence of European corn borer in the infested areas of New York. Averaged from data obtained during the period 1920 to 1922, inclusive

4. What territory is in the infested area?

Ans. Practically all of the New England States excepting the northern parts of New Hampshire, Vermont and Maine. Michigan, Indiana, Ohio, Pennsylvania, and New York in the following areas: About three-fourths of New York, comprising the northwestern section; the northwestern half of Pennsylvania; the northern half of Ohio; the southeastern half of Michigan; and a few counties in northeastern Indiana.

Distribution of the European Corn Borer in the United States



Map showing the distribution of the European corn borer as known November 1, 1926. The outside (darkly shaded area) indicates the spread of the pest which is believed to have occurred during the summer of 1926. (Infested area in New England not shown)

5. What is the acreage in the infested area? In the clean-up area?

Ans. There are about sixty million acres in the infested area. About two million five hundred thousand acres of corn land will be cleaned up under the Corn-Borer Act.

6. How does the borer attack the corn plant?

Ans. The chief injury by the borer is done by boring into the stalks so that the stalks break and the ears are not able to mature. The main damage is done by boring up and down in the cornstalks. Serious losses also result from the work of the borer because of the reduction in the number and quality of ears produced.

7. How destructive has the borer been? How heavy the infestation?

Ans. In the United States the actual monetary loss up to the present time, compared to the value of the whole corn crop, has not been large. In some individual fields, however, there has been 20 to 30 per cent damage. The heaviest infestation in the United States are along the lake front in Michigan, Ohio, Pennsylvania and New York. The possible damage from the borer in the western area has been indicated in southern Ontario, where the damage in Kent and Essex counties has reached 90 per cent of the crop. In that region the same kind of corn is grown as in the Corn Belt. In these two Counties, the infestation has been running a hundred per cent stalk infestation with 40 or 50 borers to the stalk and in 1926 the borers practically ate up the cornstalks, or ate the good out of them and went in large numbers into the weeds of the adjacent fields. In the Great Lakes region in the United States the insect has not yet become injuriously numerous, except in a very few places along Lake Erie in Ohio, where the damage has already reached 25 to 30 per cent. In the remainder of the district the insect is just spreading out here and there and has not developed in sufficient numbers to affect the crop.

8. What has been the spread of the borer in New England?

Ans. From Everett, Mass., near Boston, the original point of infestation, the borer has spread over Massachusetts and Rhode Island and into southern New Hampshire as far as Bristol. There is also a small infested area in Maine and one in southwestern Vermont. In this section the borer has not been such a menace as it is likely to be in the Corn Belt, owing to the rigid enforcement of the Massachusetts clean-up and to climatic conditions, both of which have aided in reducing the abundance of the borer.

9. Can the borer be eradicated?

Ans. Eradication is considered impossible. The object of control measures is to check the spread of the borer and reduce infestation to a minimum.

10. What has already been done to control the borer?

Ans. The seriousness of the situation was realized in 1917, when a foreign quarantine was promptly declared and a domestic quarantine established to prevent the artificial spread of the borer. The domestic quarantine was effective only against the spread by human means, as no human power apparently can prevent the insect from dispersing within the range of its own flight. The spread of the borer by its own agency is limited; ordinarily a few miles (5, 10, or 20 miles). Ten kinds or species of parasites of the borer have been introduced from its original home in Europe.

11. What is being done in Canada to control the borer?

Ans. According to law, the council of a county, city or separated town in Ontario may, and, upon notice in writing from the Provincial Entomologist, shall provide an inspector for the purpose of controlling the corn borer. This inspector has authority to enter upon any premises where he has reason to believe that the corn borer exists and give advice and instruction as to methods of control approved by the Provincial Entomologists. If the occupant neglects to observe the instructions given, the inspector has the authority to take the necessary measures and charge the resulting costs against the farmer. Such costs are collected in the same manner as the taxes. Under the 1926 amendment the law requires all farmers growing corn to destroy by burning or by plowing under completely all cornstalks, pieces of stalks and cobs of each year's corn crop if not fed, ensiled, shredded or mixed with manure. All shelled corn and corn on the cob must be stored in a perfectly dry place after May 20 and all corn stubble plowed completely under. All these control measures must be completed by the individual farmer not later than May 20.

12. How heavy is the present infestation of the borers in the area in the Lake Region in which they first appeared?

Ans. In western New York in 1926 the estimated loss in certain fields of Dent corn was 25 per cent of the crop. A similar loss was experienced in sweet corn grown for canning.

13. How rapidly has the pest spread?

Ans. The infested area increased about 50 per cent last year. It increased very much more rapidly last year than previously.

14. How far is the borer likely to advance in a year?

Ans. The corn borer's average yearly rate of spread up to 1926 was about 20 miles. The rate of spread in 1926 was greater than this. The direction and velocity of the winds at night during the 3 or 4 weeks in June and July when the moths are flying appear to determine the rapidity of spread in any one year.

15. If no corn is grown in a given area, will this stop the borer?

Ans. No. If corn is not planted, the borers will live by spreading to weeds, large grasses, etc., and will not be exterminated. When the favorite host, corn, is not available, the corn borer is capable of living on many other succulent plants.

16. What effect does plowing completely under have on the borer?

Ans. Plowing does not kill many borers. When plowed under, the borers come to the surface, but if no corn remnants are left on the surface, they perish either from the action of the sun and air or they are eaten by birds, insect enemies or other predators. Where corn debris is left on the surface of the field the borers take refuge in this and become moths.

17. How does moisture or the lack of it affect the borer in stalks in fields, feed lots, and barnyards?

Ans. When standing corn stalks dry out the borers in them descend to the lower joints, where sufficient moisture usually remains to supply their needs. Where the corn is cut and shocked and later becomes very dry, the borers contained in it are quite likely to migrate to standing stubble in the vicinity. In the case of stalks remaining on feed lots the borers usually remain in them throughout the winter. Where the stalks are completely trampled under the surface of liquid manure or mud the borers are destroyed, but if any parts of the stalks remain protruding from the surface the borers take refuge in them and may survive.

18. What is being done to find parasites to help control the borer?

Ans. A total of 10 different species of parasites have been brought from Europe and tried out. Five of them have become established on the corn borer in Massachusetts and in the western area in Ohio and Michigan. They are wasp-like insects, true parasites of the corn borer, which attack the corn borer and kill it. But even in Europe they are not able to completely control it. It is hoped that they will assist materially in taking care of the borers which can not be destroyed by annual clean-up measures.

19. Why is not poison used in combating the borer?

Ans. The borer spends nearly all its life hidden within the corn stalks where it can not be reached by poisons. The moths deposit their eggs over a period of at least 3 weeks, so that newly hatching borers are present throughout a similar period. Some of the borers can be killed by spraying or dusting with poison at this time. In this case, however, it is necessary to make several applications of poison, which involves so great an expense as to make this method impracticable.

20. Do corn-borer moths fly all hours of the day and night? Why are light traps not used to catch moths in their flight?

Ans. They fly only in the dusk of the evening or at night. The moths are not attracted to lights in sufficient numbers to render these effective for trap purposes. Many kinds of lights have been used but none of them was effective.

21. How much of a national problem is the corn borer?

Ans. If it gets into the Corn Belt, it will probably destroy crops to the value of billions of dollars. If it gets farther into the Wabash and Mississippi Valleys, it may go down the river and spread out and become very difficult to control. The responsibility of controlling the borer apparently must be borne principally by the Federal Government, as the individual farmer has not learned how to cope adequately with the situation unaided.

22. In what States and counties will the control work under the Corn-Borer Act be conducted?

Ans. Indiana: DeKalb and Steuben Counties; and selected townships in Allen, LaGrange, Noble, and Whitley Counties.

Michigan: Bay, Branch, Calhoun, Genesee, Hillsdale, Huron, Ingham, Jackson, Lapeer, Lenawee, Livingston, Macomb, Monroe, Oakland, Sanilac, Saginaw, Shiawassee, St. Clair, Tuscola, Washtenaw, and Wayne Counties; and selected townships in Kalamazoo and St. Joseph Counties.

Ohio: Ashland, Ashtabula, Carroll, Columbiana, Crawford, Cuyahoga, Defiance, Erie, Fulton, Geauga, Hancock, Harrison, Henry, Huron, Jefferson, Lake, Lorain, Lucas, Mahoning, Medina, Ottawa, Paulding, Portage, Putnam, Richland, Sandusky, Seneca, Stark, Summit, Trumbull, Wayne, Williams, Wood, and Wyandot Counties; and selected townships in Allen, Hardin, Holmes, Knox, Marion, Morrow, Tuscarawas, and Van Wert Counties.

Pennsylvania: Beaver, Butler, Crawford, Erie, Lawrence, Mercer, Venango and Warren Counties.

New York: Selected townships in Cattaraugus, Chautauqua, Erie, Niagara and Orleans Counties.

23. How effective will the \$10,000,000 clean-up experiment be?

Ans. It is hoped that the borer will be kept from moving forward into Illinois, Iowa, and other States where it would be likely to do much damage. If the proposed control measures succeed in keeping down the number of borers so that the damage they do is not serious it will indicate that the method of control proposed under the Corn-Borer Act is effective. The time appears to be opportune for this experiment in large-scale control, since the infestation in the areas selected is scanty as yet and serious injury is only beginning to be felt.

24. How will the borer be cleaned up in the infested area?

Ans. Cornstalks will either be gathered and burned or plowed under completely; care will be taken not to drag any debris to the surface afterwards. Corn stubble will be destroyed with a machine known as the stubble pulverizer, which beats the corn stubble into a finely shredded form, thus killing from 90 to 95 per cent of the borers in the stubble. In badly infested areas the fence rows and weeds adjacent to the fields will be burned. All cornstalks, pieces of cornstalk and corncobs around barnyards will be cleaned up and burned. It is expected that the farmers will take care of the clean-up on 75 or 80 per cent of the farms, leaving 20 per cent of the farms in the control area to be cleaned up by the government. The plan is to pay the farmers for all the work done over and above their normal farming operations at a rate not to exceed \$2.00 per acre for field corn and \$1.00 per acre for sweet corn.

25. How much of the work will be done voluntarily by farmers? How much by regulatory forces? How will they supplement each other?

Ans. It is estimated that 80 per cent of the 2,500,000 acres in the infested area will be cleaned up by the farmers themselves, under the supervision of Federal agents operating under State authority. The farmers will be given until May 1 to complete these control measures. After that date the Federal forces will complete the clean-up on the remaining area, which it is estimated will be about 20 per cent, or 500,000 acres.

26. What constitutes a satisfactory clean-up by the individual farmer, under the regulations approved for carrying out the Corn-Borer Act?

Ans. The regulations adopted require the burning or satisfactory destruction of all cornstalks, remnants of stalks, and corncobs, either in the field, the feedlot, the barnyard, or around canning factories and other similar establishments, unless ensiled or shredded. The cornfields must be plowed to such a depth that no stalks, pieces of cobs or other corn remnants appear on the surface when it is plowed, disked, harrowed, planted, and cultivated. To comply with the regulations the individual farmer must (1) BURN OR PLOW UNDER COMPLETELY all cornstalks, stubbles, cobs and trash left in the field; (2) BURN all cornstalks, cobs, and trash in barnyards, feedlots, stacks or elsewhere, that have not been shredded or made into silage. In fields which have contained corn but which already have been seeded to oats or wheat, and which contain corn stubble, the pulverizer will be used to destroy the stubble. In this case the cost of the operation may be assessed against the owner or deducted from his compensation allowance for extra work.

27. Can the farmer use his regular equipment in meeting clean-up requirements?

Ans. Yes, in most cases, if he does his work thoroughly. A chain or wire attached to an ordinary plow may be required to properly turn under standing cornstalks and stubble.

28. What equipment should the individual farmer have to clean up satisfactorily?

Ans. (1) A spike-tooth harrow, (2) a sharp disk harrow, (3) a good horse rake, (4) a disk sharpener, (5) a good plow (14 inch, 16 inch, or 18 inch bottom), (6) a wagon rack with tight floor, (7) a manure spreader, and (8) a silage cutter.

29. In a field in which the cornstalks are still standing, how should the farmer remove the stalks and clean up and plow his field? What equipment will he need?

Ans. He will need the following equipment: (1) A spike-tooth harrow, (2) a sharp disk harrow, (3) a good stalk rake, either a spring-tooth rake or a side-delivery rake, and (4) a disk sharpener, either grindstone type or cutter type. He should: (1) harrow down stalks (if heavy) with spike-tooth harrow in the same direction in which disking will be done; (2) double disk the field, the first disking splitting each corn row with the disk middle, the second splitting the small ridge where the disk has overlapped (the disks should be sharpened before work is begun); (3) rake stalks crosswise of the direction of double disking; (4) burn the windrow of stalks, gathering and burning all fragments left from first burning; (5) disk field a third time in same direction as previous disking, and, if necessary, double disk, thus cutting up the corn stubble and roots; (6) adjust plow to proper depth of plowing, using heavy wire for trash guard (a 14 inch or 16 inch plow is needed to do this work properly); (7) plow the field so that all trash and roots are completely covered; and (8) clean fence rows or ditch banks around field by cutting briars and careful burning, using care to protect wood fence posts by using fresh soil, or by previous cleaning around posts. When stalks have been well poled down, the disking can be decreased, but a thorough disking before plowing is necessary to put the corn stubble in condition to be completely plowed under.

30. In a field from which the corn has been removed, leaving only the stubble, how should the farmer proceed to clean up and plow his field? What equipment will he need?

Ans. He will need the following equipment: (1) A sharp disk harrow and (2) a disk-harrow sharpener, either grindstone type or cutter type. He will then: (1) Sharpen disks on the harrow; (2) place weights on the harrow to help hold disk down to do thorough cutting in order to destroy stubble and split up corn roots; (3) double disk field, the first disking splitting each corn row with the disk middle, the second splitting the small ridge where the disk has overlapped; (4) adjust plow to proper depth, using heavy wire for trash guard; (a 14 inch or 16 inch plow is needed to do this work effectively); (5) plow the field so that all stubble and trash will be turned under completely; and (6) clean fence rows or ditch banks around the field by cutting briars and careful burning, using care to protect wooden fence posts by use of fresh soil or by cleaning around posts before burning.

31. How should the farmer clean-up a field already plowed or seeded? What equipment will he need?

Ans. For this work he will need (1) disk harrow, (2) corn stubble beater, (a stubble beater with power may be rented from regulatory officials at \$1.00 per acre), (3) mower or stubble shaver, (4) rake, (5) sharp hoes, spades, corn knives, and (6) bags or baskets. In fields where small grain is seeded in standing stalks, he should cut stalks with stubble shaver or mower for burning, cutting close to ground, two inches or less. Rake and burn, using care in clean-up to get all loose stalks. He should use stubble beater, if necessary, to destroy corn stubble. In plowed or seeded fields where only a few stalks are found, stalks and refuse should be gathered in baskets or sacks and burned, using hoe or knife to loosen stalks if necessary. He should clean up fence rows or ditch banks around field by cutting bushes and stalks and burning the trash, using care to protect wooden posts by using fresh dirt, or cleaning around posts before burning.

32. How should the farmer clean his feedlots of old cornstalks? What equipment will he need?

Ans. He will need the following equipment: (1) A wagon rack with tight floor, (2) a manure spreader, and (3) a silage cutter. If corn stalks in feedlots, racks, hay mows, stalks, shed roofs, etc., are reasonably dry, he should (1) gather stalks on rack wagon and haul to field and burn, using care that no material is scattered over pasture or field in hauling, also using care in completely burning pile in the field; and (2) carefully check all feed racks, sheds, etc., to see that all cornstalk refuse is cleaned up. If stalks are damp it may be advisable after piling them in the field to allow them to dry for a few days and then thoroughly saturate with oil to hasten burning. Refuse oil from automobiles is excellent for this purpose if available. If cornstalks are wet, or burning is not practical, he should (1) make a short blower pipe for silage cutter in inverted U-shape with open end two feet above top of manure-spreader box, using old sackings to fasten around open end, to help check speed of material as it is discharged into spreader; (2) set silage cutter at convenient place; (3) gather all cornstalk refuse around feedlots and buildings, run them through silage cutter, cutting in not to exceed one-half inch lengths, and discharge direct into manure spreader. (Use care not to gather up stones, brick bats, etc., in running stalks through silage cutter); (4) haul direct to field and spread thin; (a) if possible spread the shredded stalks over a field that will be plowed; (b) if no field is available to be plowed, spread the shredded stalks on pasture or meadow land. Under no circumstances should the shredded stalks be spread on land that was in corn last year, that has already been plowed. (5) If there is no field available upon which to spread the shredded stalks, they may be left in the manure pit to decay and be hauled to the field in fall. (6) Check over all possible places around feedlots and buildings to see that no cornstalk refuse remains.

33. What measures need to be taken with sound ear corn in the crib in preventing the spread of the borer?

Ans. None at present. The rate of infestation in ear corn is so slight as to be insignificant at present. Later on, if infestation should become heavy, proper measures, such as screening cribs, may be necessary.

34. What operations will the farmer be paid for?

Ans. The Federal Act authorizes payment to the farmer for extra labor performed by him as part of the clean-up campaign; such extra labor is interpreted to mean such work as is additional to that which is normal and usual in ordinary farm operations.

35. Who will measure the corn acreage on the basis of which cooperating individual farmers will be reimbursed?

Ans. The farmer should do this, with the knowledge that the Federal inspector will check up for accuracy.

36. How will the \$10,000,000 be spent?

Ans. The appropriation will be used largely to reimburse farmers for work done by them in connection with the clean-up, which is not normal or usual in ordinary farm operations; to purchase and operate special machinery; and to provide such supplies and equipment as are required in thoroughly carrying out control measures.

37. Will a similar appropriation be required next year and annually thereafter?

Ans. If it is demonstrated that the proposed method of control produces satisfactory results, Congress will have to determine whether similar measures shall be provided for in the future.

38. What State legislation has been enacted?

Ans. Massachusetts has a State law authorizing the quarantine and enforcement of control measures, including the fall plowing of cornfields in infested areas by December 1 of each year. All other States, up to the passage of the Corn Borer Act by Congress, had been operating under existing insect-pest control and nursery-inspection laws.

39. What State legislation was required by the terms of the Federal Corn-Borer Act?

Ans. State legislation is required by the Act which will give the State Department of Agriculture in each State authority to promulgate quarantines and quarantine restrictions within the State, which will permit the Department or its authorized agents free access within reasonable hours

to any farm or any other place where it seems desirable to go in carrying out the clean-up campaign, and which will provide penalties for violations of rules or regulations. In case the farmers do not clean up their premises within the time limit, according to the instructions given them, the State legislation will give designated agents of the Department the authority to clean up and take all necessary precautions against the spread of the corn borer, charging the amount to the owner of the premises. This legislation further gives the State Department of Agriculture the authority to pay to the Treasurer of the United States such portion of the amount assessed against farmers not complying with the regulations, as represents expenditures incurred by the United States in carrying out the cooperative control measures.

40. What funds are the States contributing to corn-borer work? How will they cooperate in the campaign? From a regulatory standpoint? From an educational standpoint?

Ans. Indications are that about \$1,250,000 will be made available by the States in the corn-borer work this year. The State Department of Agriculture in each State will deputize the Federal inspectors and other officials employed under the Corn-Borer Act, giving them full authority under the State law to carry out necessary control measures. The actual work of enforced clean-up will be carried on by the Federal forces. The first step to be taken will be to notify farmers of the necessary measures which they must take according to the regulations adopted. It is expected that individual farmers voluntarily cooperating in the clean-up will take the necessary measures by May 1. After May 1, all infested farms will be inspected. If reported as meeting all requirements as to control measures, the individual farmer will be reimbursed not to exceed \$2.00 an acre for field corn and not to exceed \$1.00 an acre for sweet corn on which he is obliged to undertake operations in addition to those normal and usual in farm operations at this season.

Where the regulations have not been complied with either intentionally or unintentionally, the Federal forces, under the authority of the State Department of Agriculture, will conduct the necessary clean-up with its own special machinery and crews. The farm cost of such enforced clean-up will be charged to the individuals on whose farms the work is done and will be collected on the same basis as taxes by the State authorities. The funds collected in this way by the State authorities which represent expenditure of Federal money will be turned over to the United States Treasury as provided for in the Federal Act and State legislation. Under the plan of cooperation the officials of the State Departments of Agriculture will be responsible for instituting all necessary legal action connected with the clean-up.

Prior to May 1 a large number of local field demonstrations in the selection and operation of machinery effective in borer control work will be given as part of an intensive educational and publicity campaign to be put on by the United States Department of Agriculture, the extension divisions

of the State agricultural colleges, and county extension agents. This supplementary campaign will consist of holding educational field meetings, activities of county and local committees in the interest of voluntary clean-up of the borer, supplying information to the press and other news agencies, and the distribution of educational material through the extension forces.

41. By whom were the proposed control measures under the Corn-Borer Act prepared?

Ans. These plans were prepared at the instance of what is known as the International Corn-Borer Committee, composed of representatives of the farm organizations, agricultural colleges, and experiment stations, State Departments of Agriculture, and other institutions and organizations in the United States and Canada interested in the control of the corn borer and prevention of its spread to the Corn Belt. The actual plans for the clean-up, as approved by the International Corn-Borer Committee, were drawn up by L. H. Worthley, in charge of corn-borer control work, Bureau of Entomology, United States Department of Agriculture, and C. O. Reed, Professor of Agricultural Engineering, Ohio State University, with the assistance of representative entomologists, agricultural engineers, and others interested in the corn-borer control work in the various States interested.

42. Who are the executive officers of the International Corn-Borer Committee?

Ans. The following are executive officers of the committee:

G. I. Christie, director, Agricultural Experiment Station, Purdue University, Lafayette, Ind., chairman.
C. V. Truax, director, Department of Agriculture, Columbus, Ohio, secretary.
C. F. Curtiss, dean and director, division of agriculture, Iowa State College, Ames, Iowa.
L. E. Cell, director, Agricultural Experiment Station, Kansas State College, Manhattan, Kansas.
C. G. Woodbury, director, raw products research, National Canners' Association, Washington, D. C.
Arthur Gibson, Dominion Entomologist, Department of Agriculture, Ottawa, Canada.
Sam Thompson, president, American Farm Bureau Federation, Chicago, Illinois.
L. J. Tabor, master, National Grange, Columbus, Ohio.
A. C. Carton, director, bureau agricultural industry, Department of Agriculture, Lansing, Mich.
C. M. Willetts, director, Department of Agriculture, Harrisburg, Pa.
C. P. Mergord, assistant commissioner, Department of Farms and Markets, Albany, N. Y.
L. H. Worthley, in charge of quarantine work, United States Department of Agriculture, 2036 E. Twenty-second Street, Cleveland, Ohio.
C. O. Reed, division of agricultural engineering, Ohio State University, Columbus, Ohio.

